Far Detector CDR Geometry in MC Simulation

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See note 832 for more detail

CDR Geometry

- Changes from previous geometries/simulations for structure and size
  - Extra thickness of extrusion walls in vertically-oriented planes
  - Blocks begin and end with vertically-oriented plans
  - Smaller number of planes
- 1cm-thick expansion gaps between blocks
- Add attempt at upstream cosmic wall
  - modeled by 18m x 18m x 3 m concrete wall 5m upstream of 1st plane
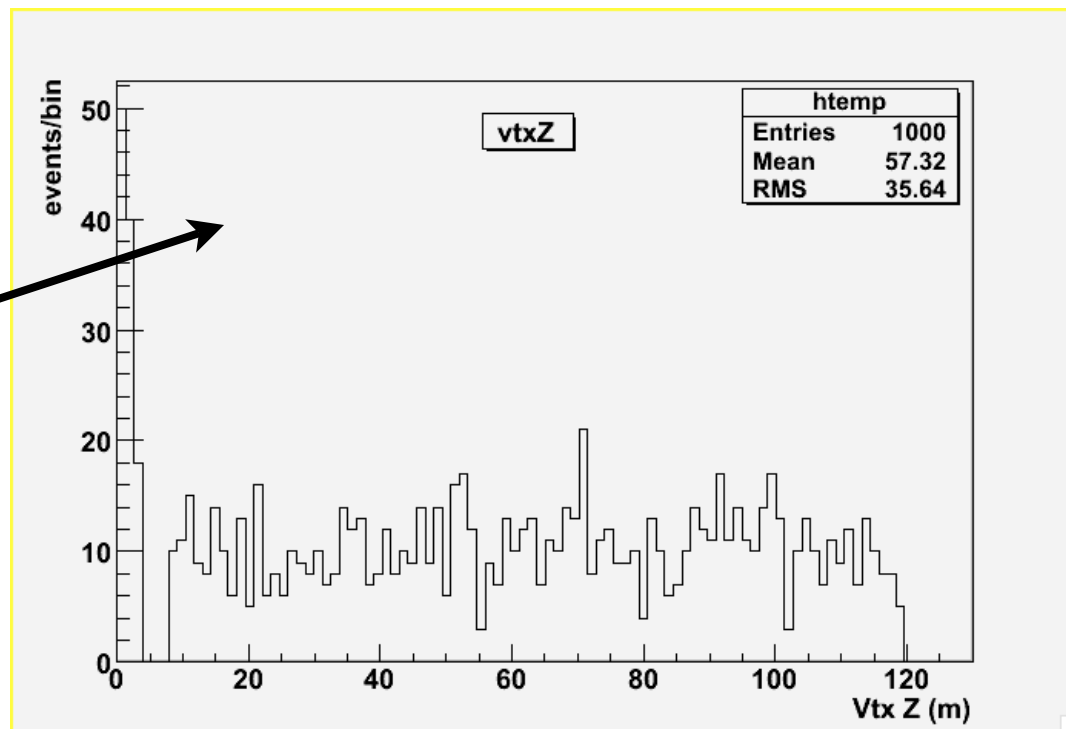- FFR file: cdrc_far.ffr

Large Scale Validation

- **1000 ν_μ CC events ($\varphi \sim 1/E$), with shield**
  - ▸ Shield shows up at right location, with about right proportion of interactions

- **10000 ν_μ CC events ($\varphi \sim 1/E$), no shield**

- ▸ Length
  - Expect 111.014m
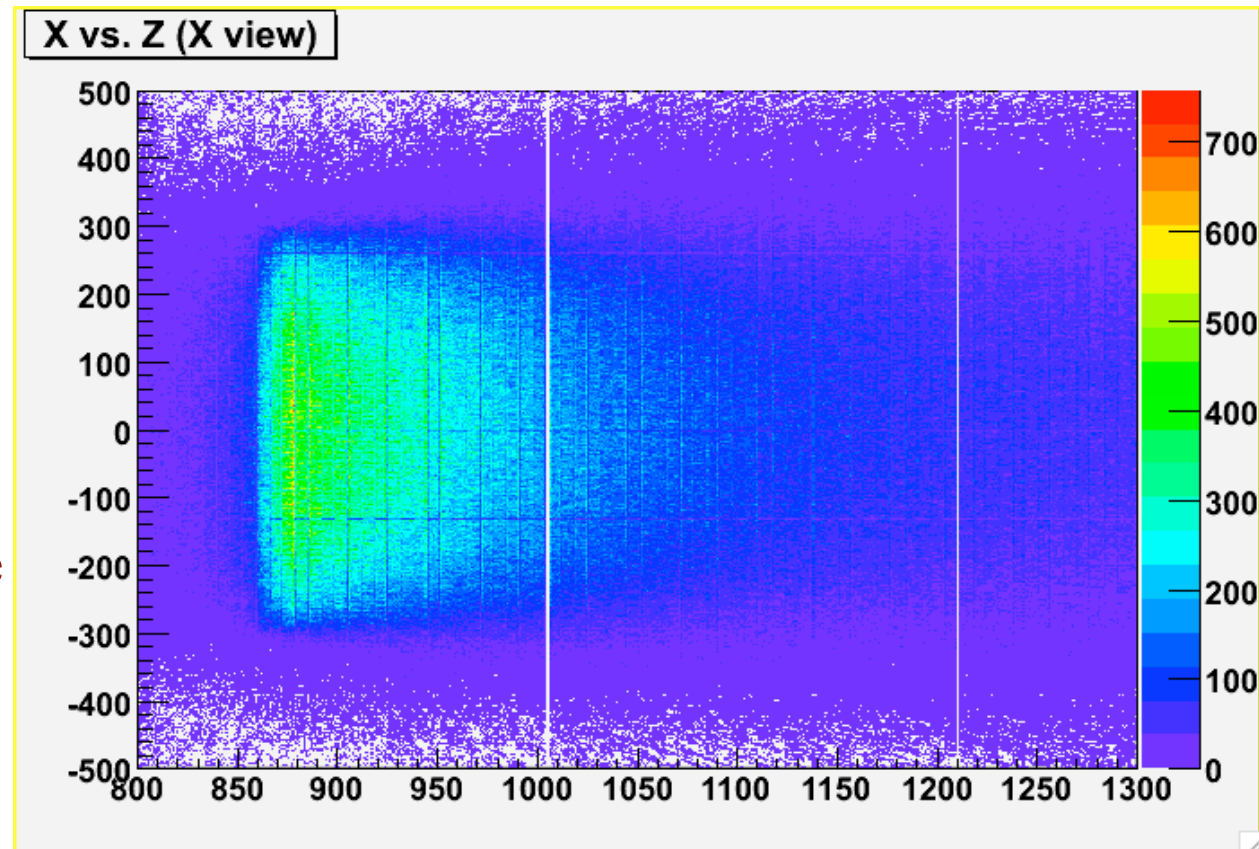 - Observed - 111.006m+/- 0.025m at 90%CL

Width

Expect 15.7m in X and Y

Observe 15.7m within 1mm

Small-scale

- ~22,000 ν_μ CC events ($\varphi \sim 1/E$)

  ▸ Planes 10-12 only, within 3m radius of detector axis

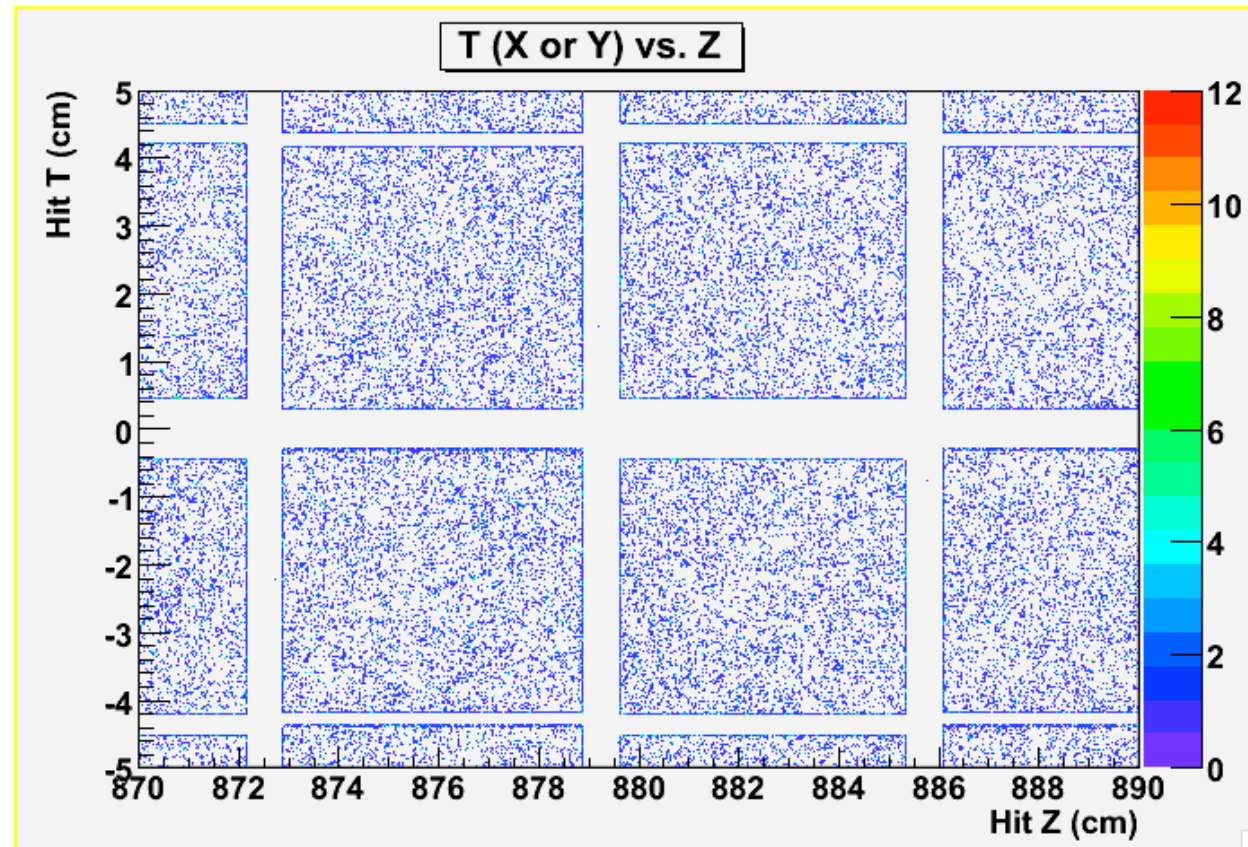 ▸ Use energy hits (not vertices) to illuminate cell structure

Cell Structure

- All Cell Sizes, and Gaps (cell-cell, plane-plane, block-block, extrusion-extrusion) are verified to be correct.

  ▸ Exception: small excess in gap between cells in adjacent vertical extrusions

    - Due to rounding error in CDR table?

    - Not an accumulating effect, so ignorable at least for now

Position of hits - zoomed view

Summary

- CDR geometry changes have been incorporated into GMINOS geometry card file

- Resulting geometry has been validated

- Initial samples have been generated: 100k events each for ν_μ(-bar) cc, nc, ν_e(-bar) cc.

  ‣ Data are in /pnfs/p929/newsim/far (gaf and root files)